

**PATENT**

**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**In re Application of:**

Meikrantz et al.

**Serial No.:** Not Yet Assigned

**Filed:** \_\_\_\_\_

**For:** CESIUM AND STRONTIUM  
EXTRACTION USING A MIXED  
EXTRACTANT SOLVENT INCLUDING  
CROWN ETHER AND CALIXARENE  
EXTRACTANTS

**Confirmation No.:** Unknown

**Examiner:** Unknown

**Group Art Unit:** Unknown

**Attorney Docket No.:** B-424

**NOTICE OF EXPRESS MAILING**

Express Mail Mailing Label Number: ER202502980US  
Date of Deposit with USPS: 3/23/04  
Person making Deposit: Mandy Fandon

**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

In compliance with the duty to disclose information material to patentability pursuant to 37 C.F.R. § 1.56, it is respectfully requested that this Information Disclosure Statement be entered and the documents listed on attached Form PTO-1449 or PTO/SB/08 be considered by the Examiner and made of record. Copies of the listed documents are enclosed pursuant to 37 C.F.R. § 1.98(a).

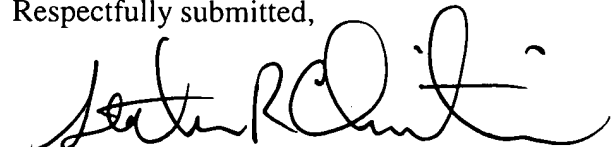
In accordance with 37 C.F.R. § 1.97(g) and (h), filing of this Information Disclosure Statement is not to be construed as a representation that a search has been made or an admission

that the information cited herein is, or is considered to be, material to patentability as defined in 37 C.F.R. § 1.56(b). Further, no representation is made by Applicants herein that no other possible material information as defined in 37 C.F.R. § 1.56(b) exists.

Applicants offer to supply any explanation or discussion of the documents that the Examiner feels is necessary or desirable and which is requested.

This Information Disclosure Statement is filed within three (3) months of the filing date of the above-identified application, and no certification pursuant to 37 C.F.R. § 1.97(c) or a fee pursuant to 37 C.F.R. § 1.17(p) is required.

Respectfully submitted,



Stephen R. Christian  
Registration No. 32,687  
Attorney for Applicants  
P.O. Box 1625  
Idaho Falls, ID 83415-3899  
Phone: (208) 526-9140  
Fax: (208) 526-8339

Date: 23 MAR 2004

Enclosures: Form PTO-1449 or PTO/SB/08  
Cited Documents

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Substitute for form 1449A/PTO <b>INFORMATION DISCLOSURE STATEMENT BY APPLICANT</b>  (use as many sheets as necessary)				<b>Complete if Known</b>	
				Application Number	Not Yet Assigned
				Filing Date	
				First Named Inventor	Meikrantz et al.
				Group Art Unit	Unknown
				Examiner Name	Unknown
				Attorney Docket Number	B-424
Sheet	1	of	3		

U.S. PATENT DOCUMENTS					
Examiner Initials *	Cite No. <sup>1</sup>	Document Number	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
		Number - Kind Code <sup>2</sup> (if known)			
		US-4,749,518	06/07/1988	Davis, Jr. et al.	
		US- 5,344,623	09/06/1994	Horwitz et al.	
		US- 5,346,618	09/13/1994	Horwitz et al.	
		US- 5,393,892	02/28/1995	Krakoviak et al.	
		US- 5,607,591	03/04/1997	Dozol et al.	
		US- 5,666,641	09/09/1997	Abney et al.	
		US- 5,666,642	09/09/1997	Hawthorne et al.	
		US- 5,698,169	12/16/1997	Hawthorne et al.	
		US- 5,888,398	03/30/1999	Dietz et al.	
		US- 5,926,687	07/20/1999	Dozol et al.	
		US- 6,040,462	03/21/2000	Oh et al.	
		US- 6,174,503 B1	01/16/2001	Moyer et al.	
		US- 6,258,333 B1	07/10/2001	Romanovskiy et al.	
		US- 6,270,737 B1	08/07/2001	Zaitsev et al.	
		US- 2001/0033814 A1	10/25/2001	Romanovskiy et al.	
		US- 6,468,445 B2	10/22/2002	Romanovskiy et al.	
		US- 6,511,603 B1	01/28/2003	Dietz et al.	
		US- 6,566,561 B1	05/20/2003	Bonnesen et al.	
		US-			
		US-			

[illegible]

Examiner Signature		Date Considered	
-----------------------	--	--------------------	--

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Applicant's unique citation designation number (optional). <sup>2</sup> See Kinds Codes of USPTO Patent Documents at [www.uspto.gov](http://www.uspto.gov) or MPEP 901.04. <sup>3</sup> Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3). <sup>4</sup> For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document. <sup>5</sup> Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible. <sup>6</sup> Applicant is to place a check mark here if English language Translation is attached.

**Burden Hour Statement:** This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet

3

of

3

**Complete if Known**

Application Number	Not Yet Assigned
Filing Date	
First Named Inventor	Meikrantz et al.
Group Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	B 424

**OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS**

Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		LEONARD et al., "Development of a Solvent Extraction Process for Cesium Removal From SRS Tank Waste," Sep. Sci. and Technol., 36(5-6):743-766 (2001).	
		LEONARD et al., "Experimental Verification of Caustic-Side Solvent Extraction for Removal of Cesium from Tank Waste," Solvent Extr. and Ion Exch., 21(4) :505-526 (2003).	
		MOYER et al., "Complexation of Strontium in the Synergistic Extraction System Dicyclohexano-18-Crown-6, Versatic Acid, Carbon Tetrachloride," Solvent Ext. and Ion Exch., 4(1), 83-93 (1986).	
		NORATO et al., "Demonstration of the Caustic-Side Solvent Extraction Process for the Removal of <sup>137</sup> Cs from Savannah River Site High Level Waste," Sep. Sci. and Technol., 38(12-13):2647-2666 (2003).	
		SACHLEBEN et al., "Surveying the Extraction of Cesium Nitrate by 1,3-Alternate Calix[4]Arene Crown-6 Ethers in 1,2-Dichloroethane," Solvent Ext. and Ion Exch., 17(6), 1445-1459 (1999).	
		SHEHATA, F.A., "Extraction of Strontium from Nitric Acid Solutions by Selected Crown Ethers," J. of Radioanalytical and Nuclear Chem., Articles, 185(2) 411-417 (1994).	
		TANIGAWA et al., "Solvent Extraction of Alkali Metals by Crown Ethers," Chem. Eng. J., 39:157-168 (1988).	
		WHITE et al., "Stability Study of Cs Extraction Solvent," Sep. Sci. and Technol., 38(12-13):2667-2683 (2003).	
		WOOD et al., "Effect of the Interference of Alkali and Alkaline Earth Metal Ions on the Extraction of <sup>90</sup> Sr From Acidic Nuclear Waste Solutions by 18-crown-6 Derivatives," Solvent Ext. and Ion Exch., 13(5), 829-844 (1995).	
		WOOD et al., "Extraction of Lead and Strontium from Hazardous Waste Streams by Solvent Extraction with 4',4',(5')-DI-(T-Butyldicyclohexo)-18-crown-6," Solvent Ext. and Ion Exch., 15(1), 65-78 (1997).	
		ZIRNHELT et al., "Strontium Extraction with a Polymer-Bound 18-Crown-6 Polyether," Sep. Sci. and Technol., 28(15&16):2419-2429 (1993).	

Examiner  
SignatureDate  
Considered

\* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.

Substitute for form 1449A/PTO

**INFORMATION DISCLOSURE  
STATEMENT BY APPLICANT**

(use as many sheets as necessary)

Sheet

2

of

3

**Complete if Known**

Application Number	Not Yet Assigned
Filing Date	
First Named Inventor	Meikrantz et al.
Group Art Unit	Unknown
Examiner Name	Unknown
Attorney Docket Number	B-424

**OTHER PRIOR ART -- NON PATENT LITERATURE DOCUMENTS**

Examiner Initials *	Cite No. <sup>1</sup>	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T <sup>2</sup>
		BONNESEN et al., "Alkaline-Side Extraction of Cesium from Savannah River Tank Waste Using a Calixarene-Crown Ether Extractant," ORNL/TM-13704, Oak Ridge National Laboratory: Oak ridge, TN, pp. ii-102 (Dec 1998).	
		BONNESEN et al., "Development of Process Chemistry for the Removal of Cesium from Acidic Nuclear Waste by Calix[4]arene-crown-6 Ethers," ACS Sym. Ser. 757 (Calixarenes for Separations), Am. Chem. Soc., pp. 26-44 (2000).	
		CHIARIZIA et al., "Composition of the Organic Phase Species in the Synergistic Extraction of Sr <sup>2+</sup> by Mixtures of Di(2-Ethylhexyl) Alkylendiphosphonic Acids and Dicyclohexano-18-crown-6," Solvent Extr. and Ion Exch., 21(2):171-197 (2003).	
		DIETZ et al., "Extraction of Strontium from Acidic Nitrate Media Using a Modified PUREX Solvent," Solvent Extr. and Ion Exch., 13(1), 1-17 (1995).	
		DIETZ et al., "Substituent Effects in the Extraction of Cesium from Acidic Nitrate Media With Macrocyclic Polyethers," Solvent Extr. and Ion Exch., 14(3), 357-384 (1996).	
		DOZOL et al., "A Solution for Cesium Removal from High-Salinity Acidic or Alkaline Liquid Waste: The Crown Calix[4]Arenes," Sep. Sci. and Technol., 34(6&7):877-909 (1999).	
		DUCHÉMIN et al., "Solvatochromic Solvent Polarity Measurements of Alcohol Solvent Modifiers and Correlation with Cesium Extraction Strength," Solvent Extr. and Ion Exch., 19(6):1037-1058 (2001).	
		GUPTA, et al., "Effect of Diluents on the Extraction of Sr <sup>2+</sup> from HNO <sub>3</sub> Solutions with Dicyclohexano-18-crown-6," Solvent Extr. and Ion Exch., 21(1), 53-71 (2003).	
		HERBST et al., "Development and Testing of a Cobalt Dicarbolide Based Solvent Extraction Process for the Separation of Cesium and Strontium from Acidic Tank Waste," Sep. Sci. and Technol., 37(8), 1807-1831 (2002).	
		HORWITZ et al., "A Combined Cesium-Strontium Extraction/Recovery Process," International Solvent Extraction Committee '96, pp. 1285-1290 (1996).	
		HORWITZ et al., "SREX: A New Process for the Extraction and Recovery of Strontium From Acidic Nuclear Waste Streams," Solvent Extr. and Ion Exch., 9(1):1-25 (1991).	
		LAMB et al., "Novel Solvent System for Metal Ion Separation: Improved Solvent Extraction of Strontium(II) and Lead (II) as Dicyclohexano-18-crown-6 Complexes," Sep. Sci. and Technol., 34(13):2583-2599 (1999).	

Examiner  
SignatureDate  
Considered

\*EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of this form with next communication to applicant.

<sup>1</sup> Unique citation designation number (optional). <sup>2</sup> Applicant is to place a check mark here if English language Translation is attached.

Burden Hour Statement: This form is estimated to take 2.0 hours to complete. Time will vary depending upon the needs of the individual case. Any comments on the amount of time you are required to complete this form should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, Washington, DC 20231. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, Washington, DC 20231.